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Original Research Article

Patterns of oral Hygiene Practices, Knowledge on Dental Caries Prevention and its Association with Dental Health Status Among School Children Between 12-15 Years of Age

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Abstract

Introduction: Dental caries and gum disease are a major public health problem and predominantly affecting children worldwide.

Materials & Methods: A quantitative non- experimental descriptive study was conducted among 125 school children between 12-15 years from selected private schools in Kanyakumari district, Tamil Nadu. Purposive sampling technique was used to select the samples. A self-constructed and pre-tested online survey questionnaire was used to collect data. The association between demographic profiles of children with oral hygiene practice, knowledge and dental health status were analysed and interpreted by $\chi 2$ (Chi-square) test. The correlation was done by using Pearson correlation coefficient test (r). The IBM Statistics-20 was used for analysis and interpretations. The P-values < or equal to 0.05 ($P \leq 0.05$) was considered as statistically significant.

Results: The assessment of the oral hygiene practices showed that 32% of them had excellent practice, 66.4% had good practice and 1.6% had poor oral hygiene practice. Assessment of knowledge on dental carries prevention showed that 52% of them had excellent knowledge, 29.6% had good knowledge, 16% had moderate knowledge and 2.4% had poor knowledge. Assessment of dental health status among the school children showed that 6.4% had excellent, 91.2% had good and 2.4% had poor dental health status respectively. The association scores shows that there is a significant association between the mothers' education and oral hygiene practices among children ($P<0.05$). There is a significant association between fathers' education and knowledge on dental caries prevention among children ($P<0.001$). There is a weak positive significant relationship between oral hygiene practices and dental health status of children(r-0.297).

Conclusion: The researcher believes that oral hygiene practices and assessment of dental health of school children can help to improve dental health and prevent oral health problems that will benefit the children lifelong.

Keywords: Oral hygiene practices, Knowledge, Dental caries, Dental health status, School children

Introduction

Early childhood caries is the most common chronic condition among school children. Oral health directly affects overall health and quality of life of children and adults. Inadequate oral health knowledge and awareness is more likely to cause oral diseases among all age groups, including children. A study conducted in Bangladesh (2020) among 150 children between 5- 12 years of age from three primary schools shows that the students have limited awareness about oral health and poor knowledge of oral hygiene habits. Oral health awareness and hygiene practices amongst the school going children was found to be very poor [1].

A study conducted in Tanzania (2020) shows that dental caries affects a significant percentage of preschool children and was associated with poor oral hygiene [2]. In a qualitative study of the multi-level influences on oral hygiene practices for young children in the United States of America (2019), many mothers reported brushing their children's teeth twice daily, and most of the children frequently resisted to brush their teeth [3]. Poor oral hygiene behaviour is identified as an established risk factor for developing dental caries during early childhood period [4].

A variety of factors are related to oral hygiene behaviour, including oral hygiene knowledge. The results of a cross sectional study conducted in Japan (2017) suggested having better oral hygiene knowledge, as well as having dental clinics as the most common source of oral hygiene [5]. Oral hygiene knowledge was associated with better oral hygiene behaviour. Low socioeconomic status population had a high prevalence of dental caries, due to their poor oral hygiene practice, low level of awareness, incorrect food intake and the status of family [6].

A systematic review (2021) concluded that the prevalence of dental caries among children and young adults in the Middle East and North Africa region (MENA) was high [7]. Oral health is an integral part of general health, and good knowledge and oral hygiene practices are the key to achieving oral health. Children (58%) responded that they would visit the dentist only when they have a toothache, and only 11% had gone for regular dental check-ups, whereas 18% had never visited a dentist [8]. In another study, the authors concluded that parents and caregivers of preschool children had reasonable oral health knowledge. However, emphasis on oral health promotion programmes with an aim to improve early childhood oral health was suggested [9].

Caries preventive practices and dental caries among 722 boys between 6-15 years and their mothers in Saudi Arabia was assessed in 2020. The study results showed that children not using any Recommended Caries Preventive Practice (RCPP) tool had higher risk of developing dental caries. It was concluded by the researchers that brushing tooth at least twice a day, use of fluoridated toothpaste and consumption of sugary snacks less than once a day have significant influence in incidence of dental caries [10].

Materials and Methods

Study Design, Setting and Population

A quantitative non- experimental descriptive design was used in this study. The target study population include all school children between the age group of 12 to 15 years and studying in 7^{th} to 10^{th} standard from the selected private schools in Kanyakumari district, Tamil Nadu. The estimated study population was 150 school children.

Sampling technique and Data collection methods

Purposive sampling technique was used to select the samples. A total of 125 school

children of 12 to 15 years of age from two purposively selected schools of Kanyakumari District, participated in this study. Data was collected through online questionnaire developed using google forms. Explanations and clear instructions were given to students on the usage of online link and questionnaire. All children who fulfilled the inclusion and exclusion criteria participated in the study.

Pilot Study and content validity

The pilot study was conducted to determine the reliability of the tool and feasibility of the study. The reliability of the tool was tested for internal consistency using Cronbach's alpha, and was found reliable. The precision 0.9 was taken in to consideration for sample size calculation.

On-line calculator was used for sample size calculation, and the considered sample size was125. Validity of the questionnaire was done by 7 content experts, which included one Biostatistician, Two senior dentists, one Nurse Researcher and three senior Nursing faculty from reputed teaching institutions.

Tools of Research Used

A self-constructed and pre-tested online survey questionnaire with multiple choice questions was used to collect data. A self-reported structured online questionnaire was used to collect the data on dental health status of children. The questionnaire was made available in English and Tamil languages to cater better understanding of questions by children.

The questionnaire consists of 4 parts. Part A: Demographic data of child and parents; Part B: Questionnaire on Patterns of oral hygiene practices; Part C: Questionnaire on Knowledge on dental caries prevention; Part D: Questionnaire on Dental health status.

Statistical Analysis

The demographic profiles were analysed using frequency and percentage. The association between demographic profiles of children with oral hygiene practice, knowledge and dental health status were analysed and interpreted by $\chi 2$ (Chi-square) test. The correlation was done by using Pearson correlation coefficient test (r). The IBM Statistics-20 was used for analysis and interpretations. P-values less than or equal to 0.05 ($P \leq 0.05$) were treated as statistically significant.

Ethical Considerations

The data was collected online after obtaining written permission from the school principals of the selected private schools in Kanyakumari district, Tamil Nadu. Permissions were obtained from the parents of all participants. Verbal explanations regarding the study and tool were also given to the participants. Students were also informed that there are no right or wrong answers and the time taken to complete the questionnaire will be approximately 20-30 minutes. The data collected will be kept strictly confidential and the participants' rights to privacy, autonomy, confidentiality, fair treatment, protection from discomfort and harm was well-preserved. The principals and teachers from each class assisted in the online data collection. The study was conducted after the approval of the concerned Institutional Ethics Committee (IEC).

Results

Table-1 shows the description of study subjects according to their demographic profiles such as age, gender, education, fathers' education, mother's education, father's occupation, mothers' occupation and family monthly income.

Table 1: Description of study subjects according to their demographic profiles

No	Demographic profiles	Components	Frequency (n=125)	Percentage (%)
1	Age (years)	12	21	16.8
		13	33	26.4
		14	44	35.2
		15	27	21.6
2	Gender	Male	47	37.6
		Female	78	62.4
3	Educational status (standard)	7	22	17.6
		8	29	23.2
		9	27	21.6
		10	47	37.6
4	Fathers' education	School	78	62.4
		Bachelor Degree	31	24.8
		Master degree	14	11.2
		Ph. D	2	1.6
5	Mothers' Education	School	79	63.2
		Bachelor Degree	23	18.4
		Master degree	22	17.6
		Ph. D	1	0.8
6	Fathers' Occupation	Govt. sector	17	13.6
		Private sector	40	32.0
		Self employed	65	52.0
		Unemployed	3	2.4
7	Mothers' Occupation	Govt. sector	7	5.6
		House wife	101	80.8
		Private sector	15	12.0
		Self employed	2	1.6
8	Family monthly income (Rupee)	< 10,000	69	55.2
		10,000-15,000	24	19.2
		15,000-20,000	7	5.6
		>20,000	25	20.0

Assessment of Oral Hygiene Practice among School Children

The study findings showed that a majority of the students 69 (55.2%) brushed their teeth twice daily and 55 (44%) brushed teeth once daily. Most children 85 (68%) brushed their teeth morning before meal and night after meal and 26 (20.8%) brushed their teeth morning and night after meal. Almost all children 124 (99.2%) used tooth paste and tooth brush and only one child (0.8%) used tooth powder and finger to brush their teeth. Most of them 54 (43.2%) used horizontal stroke (Left to right and right to left) while brushing and 47 (37.6%) used mixed directions while brushing.

There were 113 (90.4%) children who rinsed their mouth after each meal and 7 (5.6%) rinsed their mouth occasionally after each meal. Medium bristle brush was used by 59 (47.2%), soft bristle brush by 53 (42.4), hard bristle brush by 5 (4%) and 8 (6.4%) did not know the type of brush they were using.

A majority of the children 60 (48%) did not use anything to clean their teeth other than brushing time, 47 (37.6%) used tooth pick/stick to clean their teeth other than brushing time. Most children 108 (86.4%) cleaned their tongue while brushing, 13 (10.4%) never cleaned their tongue while brushing and 4 (3.2%) cleaned occasionally. Among all children, 60 (48%) visited the dentist only when they had pain or any problem, 41(32.8%) never visited, 15 (12%) visited every 6 months, and 9 (7.2%) visited the dentist yearly. Mouth washes were never used by 53 (42.4%) of children and 6 (4.8%) of them used once in a week. The time spent for each brushing was 5-10 minutes among 66 (52.8%) children. About 51 (40.8%) brushed their teeth less than 5 minutes per brushing and 8 (6.4%) spend more than 10 minutes per brushing.

Most of the children 117 (93.6%) ate rice-based food mostly. Vegetables and fruits were mostly liked by 71 (56.8%) of children followed by meat 35 (28%). About 61 (48.8%) of children consumed fruits more than 3 times per week and 81 (64.8%) consumed vegetables more than 3 times per week, 83 (66.4%) consumed milk and dairy products more than 3 times per week, 118 (94.4%) consumed soda and soft drinks less than 3 times per week, 88 (70.4%) consumed cake, pastry, biscuit, sweets/chocolates less than 3 times per week.

Table 2: **Assessment of Oral Hygiene Practices among the school children**

Practice level	Score	No of children	%	Mean ± SD
Excellent	69-86	40	32.0	65.1 ± 5.8
Good	52-69	83	66.4	
Poor	<52	2	1.6	
Total		125	100.0	

Knowledge of Dental Caries Prevention among School Children

The study findings showed that almost all children 122 (97.6%) agreed that good oral health is important to prevent dental caries, 120 (96%) agreed that consuming lots of sweet food and drinks causes dental caries, 106 (84.8) agreed that tooth decay is caused due to more frequent intake of sugary food and drinks, 85 (68%) agreed that using fluoride tooth paste reduces dental caries, 114(91.2%) agreed that brushing and rinsing mouth after each meal prevents dental caries. A majority of the children 89 (71.2%) agreed that using dental floss prevents dental caries, 95 (76%) believed that dental check-up is required during childhood age, 88 (70.4%) agreed that visit to a dentist for check-up should be regular and periodic, 120 (96%) of them agreed that healthy eating is important in the prevention of dental caries, 118 (94.4%) agreed that the best way to clean teeth is with tooth paste and tooth brush and 67 (53.6%) agreed that eating snacks and other foods in between meals help reducing dental caries

Table 3: Assessment of knowledge of dental carries among school children

Knowledge level	Score	No of children	%	Mean ± SD
Excellent	10-12	65	52.0	9.5 ± 2.1
Good	8-10	37	29.6	
Moderate	6-8	20	16.0	
Poor	<6	3	2.4	
Total		125	100.0	

Dental Health Status

The findings of dental health status shows that 58 (46.4%) of children never had bleeding when they brushed their teeth, 55 (44%) experienced bleeding very rarely and 12 (9.6%) had bleeding at every brushing or almost every brushing. Most of the children 84 (67.2%) do not have loose tooth or a tooth which is movable, 20 (16%) of them had loose tooth or a tooth which is movable and 21 (18.8%) were not sure if they have any.

A majority of them 86 (68.8%) did not have any cavities/ decay, 20 (16%) did not know if they had any, 16 (12.8%) had one to three cavities and only 3 (2.4%) had more than 3 cavities. Most of the children 106 (84.8%) did not have any missing teeth, and 73(58.4%) did not have any filled teeth, 25 (20%) had 2 or more filled teeth and 27 (21.6%) had less than 2 filled teeth. Children who did not have any tooth ache or pain any time before were 92 (73.6%), and the remaining 33 (26.4%) experienced tooth ache or pain before. A majority of children 71 (56.8%) did not have bad smell from their mouth any time before, 33 (26.4%) of them were not sure if they had this problem and 21 (16.8%) experienced bad smell from their mouth.

Children who never had bleeding from the gums other than brushing time were 107 (85.6%), 12 (9.6%) of them had bleeding from the gums other than brushing time and 6 (4.8%) of children were not sure with this experience.

Children who never had artificial teeth were 118 (94.4%), 4 (3.2%) had artificial teeth and 3 (2.4%) were not sure if they had any. Children who did not feel any pain or discomfort in any of their tooth when drinking cold/ice/hot drinks were 101(80.8%) and 24 (19.2%) had felt this discomfort.

Most of the children 102 (81.6%) did not have any yellowish deposits (plaque) in their teeth, but 23 (18.4%) had them. About 66 (52.8%) of them felt their dental health was good, 47(37.6%) felt excellent and 12 (9.6%) of them felt that their dental health needs improvement. The mean dental health status score was 32.7 ± 4.1.

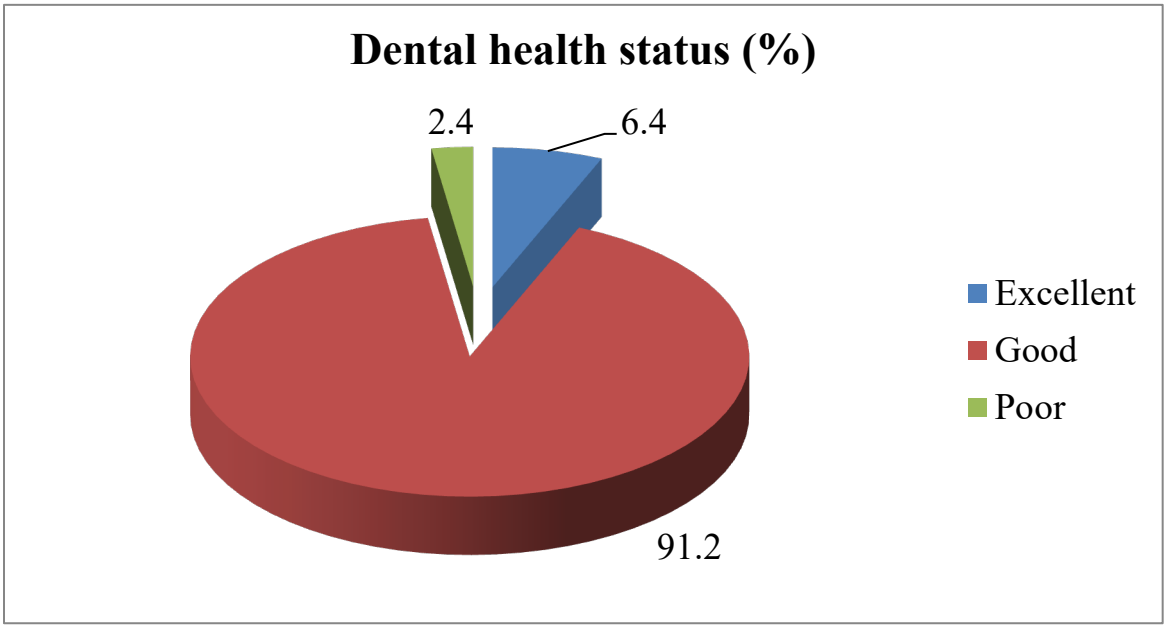

Figure 1: Percentage of dental health status among school children

Table 4: Association between mothers' educations with practice of school children

Mothers' education	Excellent		Good and poor		Total		χ^2	df	P value
	No	%	No	%	No	%			
School	21	16.8	57	45.6	78	62.4	7.791	2	P=0.020*
Graduate	13	10.4	18	14.4	31	24.8			
Post graduate	6	4.8	10	8.0	16	12.8			
Total	40	32.0	85	68.0	125	100.0			

* Denotes significant p value. P value <0.05 were considered significant

Table 5: Association between father's educations with knowledge of school children

Fathers' education	Excellent		Good, Moderate and poor		Total		χ^2	df	P value
	No	%	No	%	No	%			
School	31	24.8	47	37.6	78	62.4	13.426	2	P=0.001*
Graduate	24	19.2	7	5.6	31	24.8			
Post graduate	10	8.0	6	4.8	16	12.8			
Total	65	52.0	60	48.0	125	100.0			

* Denotes significant p value. P value <0.05 were considered significant

The results showed that there was no association between demographic profiles with dental health status among school children

Table 6: Correlations between Practice and Knowledge with dental health status

No	Variables	r	Significance	r^2	%	Determination
1	Oral hygiene Practice X Dental health status	0.297	P=0.001	0.09	8.8	Practice determined 8.8% of dental health status
2	Knowledge of dental caries prevention X Dental health status	0.163	P=0.069	0.029	2.9	Knowledge determined 2.9% of dental health status

There is a weak positive significant relationship between oral hygiene practices and dental health status of children(r-0.297).

Discussion

The findings of this study show that a majority of the students brush their teeth twice daily 69 (55.2%) and 55 (44%) of them brush teeth once daily and 85(68%) brush their teeth morning before meal and night after meal. The results of the study in Gujarat, India showed around 70% of the study participants had the habit of brushing their teeth once daily, whereas only 30% of them used to brush their teeth twice daily [11]. Children who followed tongue cleaning was 70.2% in a similar previous study [12]. About 85.6% parents and 81.4% children brushed their teeth once a day in a study conducted among children in a private dental college in India [13].

In this study, most of them 54 (43.2%) use horizontal stroke (Left to right and right to left) while brushing in this study, which is similar to another study conducted in 2020 [1].

From this study results, it is understood that, 60 (48%) children visited the dentist on pain/if any problem. These findings are similar to the study that shows 58% of children visit the dentist only when they have a toothache [8]. Similar findings are also found in another study in India, which

shows that most of the parents and children reported to dentist only in case of any dental problem [13]. The study findings shows that almost all children 120 (96%) agreed that consuming lots of sweet food and drinks causes dental caries, 106 (84.8%) agree that tooth decay is caused due to more frequent intake of sugary food and drinks, The results of this study is similar to a study (2021) done in Malawi that showed most of children (91.4%) had knowledge that dental caries is caused by consumption of sugary foodstuffs [14].

The findings of dental health status in this study shows that 58 (46.4%) of children never bleed when they brush their teeth, 55 (44%) of them bleed very rarely. This finding is controversial to the finding from a study which shows a high prevalence of dental caries, calculus, and gingival bleeding among 14–19-year-old school children from low socioeconomic status background in Saudi Arabia [15].

A majority of them 86 (68.8%) did not have any cavities/ decay, 20 (16%) do not know if they have any, 16 (12.8%) have one to three cavities and only 3 (2.4%) have more than 3 cavities. Studies also shows that dental caries prevalence is more among rural school children in Bengaluru, India [6]. It was concluded in a study conducted in Malaysia that the 11–12 -year-old Orang Asli children in Cameron Highland had high prevalence of caries and gingivitis with the majority chewed betel nut regularly.

Caries in primary teeth was associated with poor Oral Health Related Quality of Life (OHRQL) [16]. Among the total of 186 children participated in a study in United Arab Emirates, 41% of the children had dental caries [17]. The occurrence of dental caries is increasing among rural Nigerian schoolchildren, and oral hygiene status was poor and gingivitis was common among these children [18]. In this study, 12 (9.6%) of them had bleeding from the gums other than brushing time. A similar finding is found in a study that shows most children experienced toothache (30.8%) and 24.4% of them experienced gingival bleeding [14].

The results of this study shows that there is significant association between mother's education and patterns of oral hygiene practices. This study finding is also found similar in a descriptive cross-sectional observational study done in Mamyzawa refugee camp in Erbil City, Iraq, where the results of the study showed that the mothers' knowledge of oral health was low, and 63% of the children had dental caries [19].

The association scores of this study shows that there is significant association between the fathers' education and knowledge on dental caries prevention. Similar findings are seen in a study done in Qingdao, where factors such as the parents' level of education and oral health knowledge, were also significantly related to Early Childhood Caries [20]. The caries experience amongst children in relation to education of their parents revealed a significant difference ($p < 0.001$), and the mean DMFT (Decayed, Missing and Filled teeth) score was high amongst preschool children with primary school qualified parents, followed by high school qualified parents [21].

Conclusion

This study has provided information on the oral health practices, knowledge on dental caries prevention and dental health status of school children between 12-15 years of age. Oral health awareness and hygiene practices among school going children are important for general health. Hence, school-based oral health awareness and education programs are a necessity to improve the oral health and overall health of children and communities. Oral health education programs will be beneficial to reduce oral-related morbidity and its economic consequences. In order to improve the dental health status of school children, the dental

public health practitioners, school teachers and educators should consider the effect of oral hygiene practices on oral health status and plan for interventions to promote dental health of children in the future.

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